CHAPTER 4

POINT AND NONPOINT SOURCE CHARACTERIZATION OF THE WHEELER LAKE WATERSHED

4.1. BACKGROUND. This chapter is organized by HUC-10 subwatershed, and the description of each subwatershed is divided into four parts:

i. General description of the subwatershed
ii. Description of point source contributions
ii.a. Description of facilities discharging to water bodies listed on the 1998 303(d) list
iii. Description of nonpoint source contributions

The Tennessee portion of the Wheeler Lake Watershed (HUC 06030002) has been delineated into five HUC 10-digit subwatersheds.

Information for this chapter was obtained from databases maintained by the Division of Water Pollution Control or provided in the WCS (Watershed Characterization System) data set. The WCS used was version 1.1 beta (developed by Tetra Tech, Inc for EPA Region 4) released in 2000.

WCS integrates with ArcView® v3.2 and Spatial Analyst® v1.1 to analyze user-delineated (sub)watersheds based on hydrologically connected water bodies. Reports are generated by integrating WCS with Microsoft® Word. Land Use/Land Cover information from 1992 MRLC (Multi-Resolution Land Cover) data are calculated based on the proportion of county-based land use/land cover in user-delineated (sub)watersheds. Nonpoint source data in WCS are based on agricultural census data collected 1992–1998; nonpoint source data were reviewed by Tennessee NRCS staff.

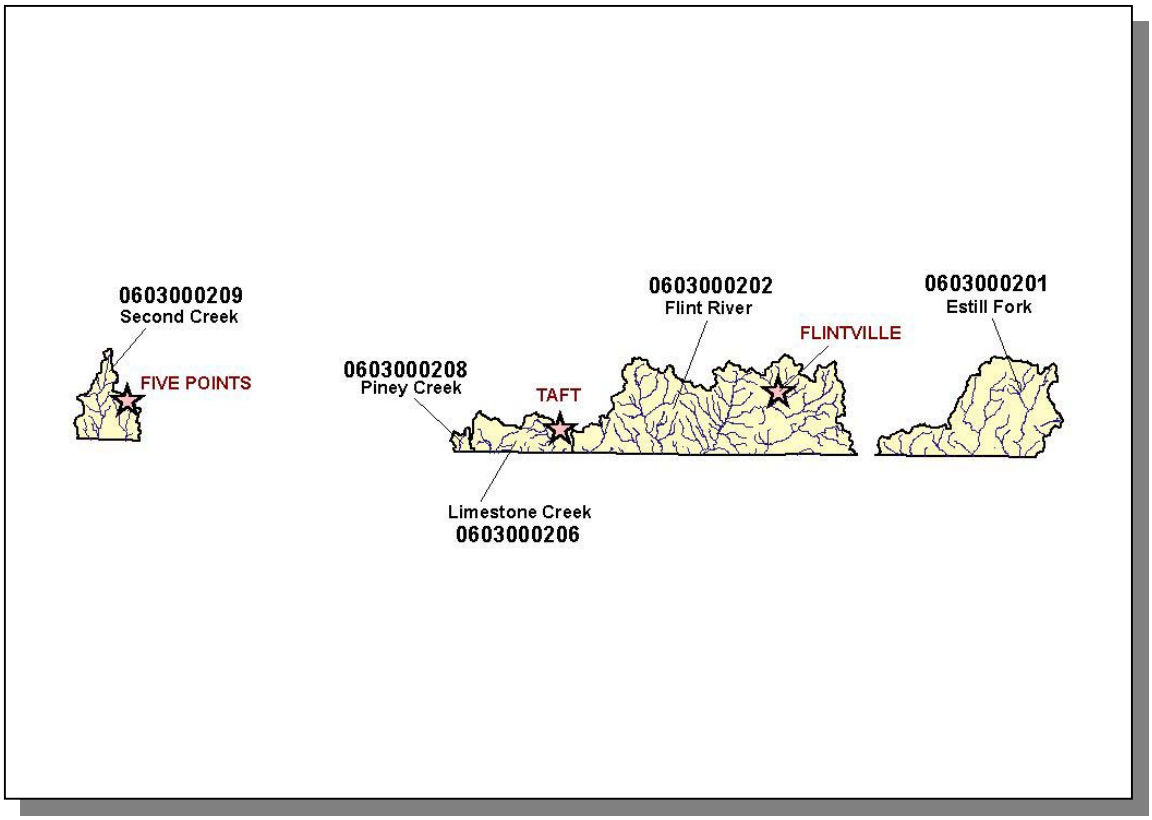

Figure 4-1. The Tennessee Portion of the Wheeler Lake Watershed is Composed of Five USGS-Delineated Subwatersheds (10-Digit Subwatersheds). *Locations of Five Points, Flintville, and Taft are shown for reference.*

4.2. CHARACTERIZATION OF HUC-10 SUBWATERSHEDS. The Watershed Characterization System (WCS) software and data sets provided by EPA Region IV were used to characterize each subwatershed in the Tennessee portion of the Wheeler Lake Watershed.

HUC-10	HUC-12
0603000201	060300020101 (Estill Fork)
	060300020102 (Larkin Creek)
0603000202	060300020201 (Flint River)
	060300020202 (Walker Creek)
	060300020203 (Briar Fork Creek)
	060300020204 (Mountain Fork)
0603000206	060300020601 (Limestone Creek)
0603000208	060300020801 (Piney Creek)
0603000209	060300020901 (Second Creek)

Table 4-1. HUC-12 Drainage Areas are Nested Within HUC-10 Drainages. *NRCS worked with USGS to delineate the HUC-10 and HUC-12 drainage boundaries.*

4.2.A. 0603000201.

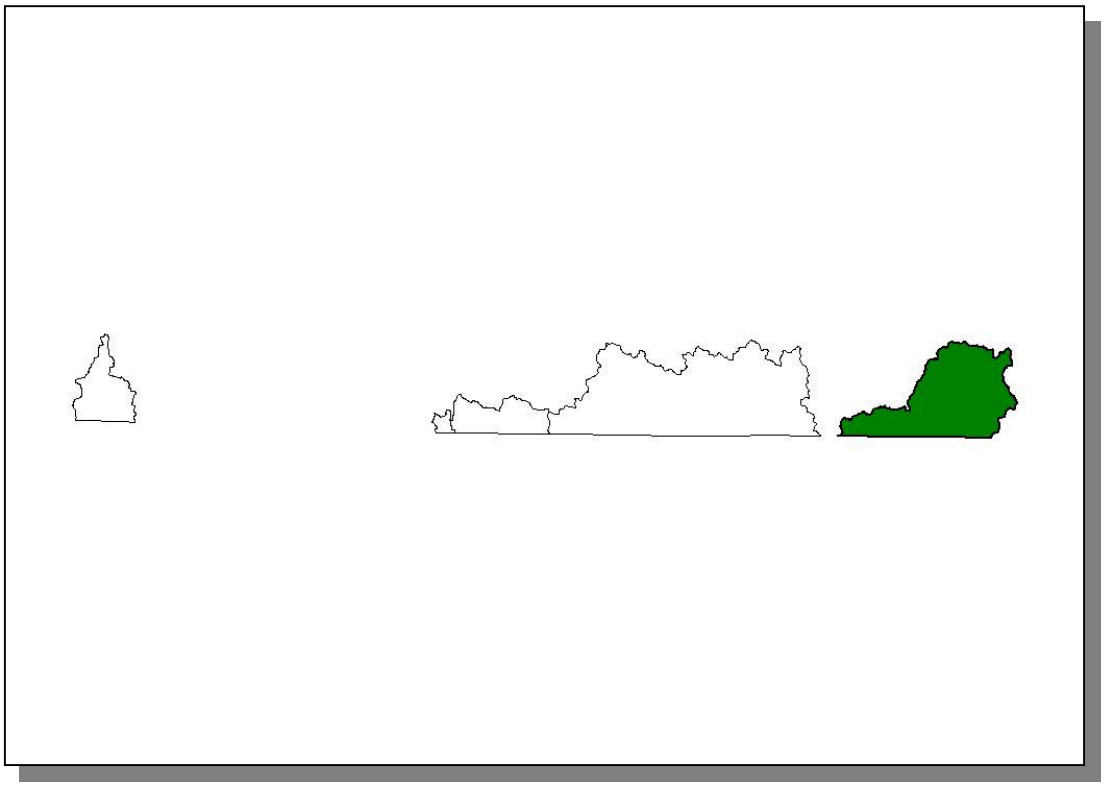

Figure 4-2. Location of Tennessee Portion of Subwatershed 0603000201. *All Wheeler Lake HUC-10 subwatershed boundaries are shown for reference.*

4.2.A.i. General Description.

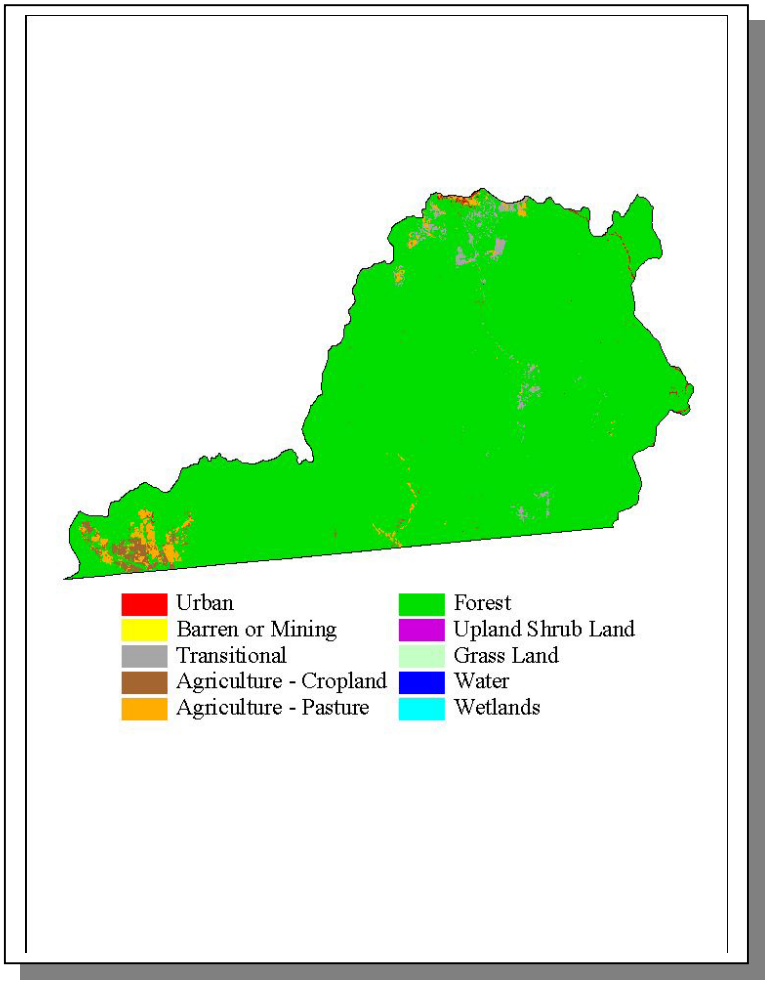

Figure 4-3. Illustration of Land Use Distribution in Subwatershed 0603000201

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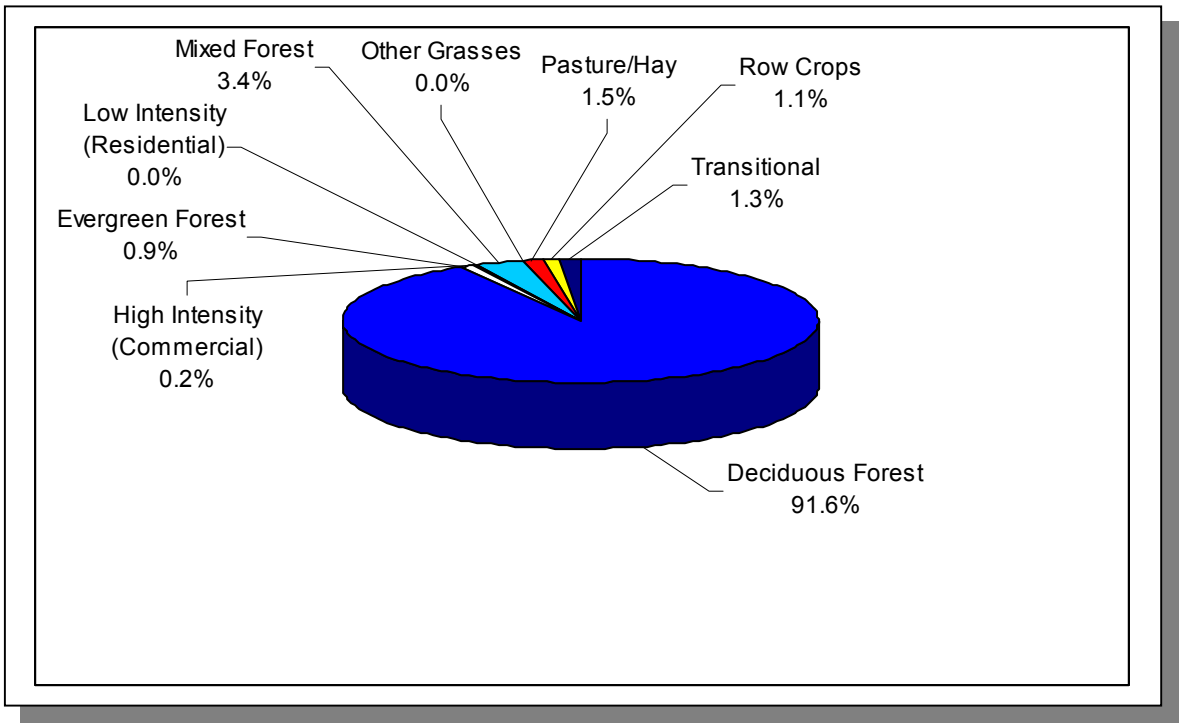

Figure 4-4. Land Use Distribution in Subwatershed 0603000201. *More information is provided in Wheeler-Appendix IV.*

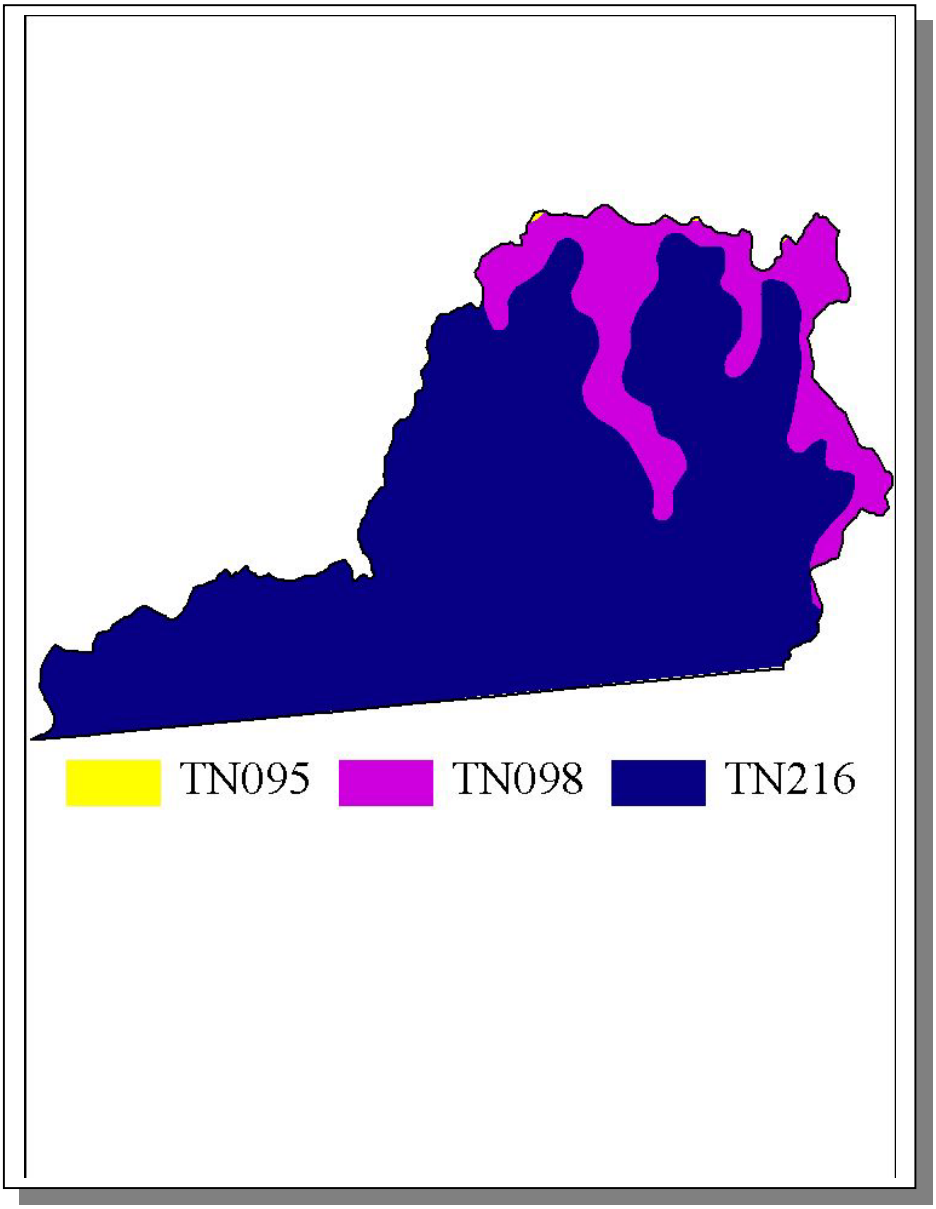

Figure 4-5. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0603000201.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN216	0.00	C	2.51	4.59	Loam	0.25

Table 4-2. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0603000201. *More details are provided in Wheeler-Appendix IV.*

	COUNTY POPULATION			ESTIMATED POPULATION IN WATERSHED		PERCENT CHANGE
County	1990	1997 Est.	Portion of Watershed (%)	1990	1997	
Franklin	34,725	37,152	10.52	3,652	3,907	7.0

Table 4-3. Population Estimates in Subwatershed 0602000301.

4.2.A.ii. Point Source Contributions.

There are no point source contributions in subwatershed 0602000301.

4.2.A.iii. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens	Chickens Sold	Hogs	Sheep
314	681	60	<5	200,144	402	2

Table 4-4. Summary of Livestock Count Estimates in Subwatershed 0603000201. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Franklin	183.4	183.0	6.0	28.7

Table 4-5. Forest Acreage and Annual Removal Rates (1987-1994) in Subwatershed 0603000201.

CROPS	TONS/ACRE/YEAR
Corn (Row Crops)	5.57
Soybeans (Row Crops)	3.88
Legume (Hayland)	1.64
Grass (Pastureland)	0.32
Grass,Forbs, Legumes (Mixed Pasture)	0.52
Forest Land (Grazed)	0.00
Forest Land (Not Grazed)	0.00
Conservation Reserve Program Land	0.09
Wheat (Close Grown Cropland)	5.55
All Other Close Grown Cropland	5.82
Other (Horticultural)	1.92
Other Cropland (Not Planted)	2.04
Nonagricultural Land Use	0.00
Farmsteads and Ranch Headquarters	0.13

Table 4-6. Annual Estimated Total Soil Loss in Subwatershed 0603000201.

4.2.B. 0603000202.

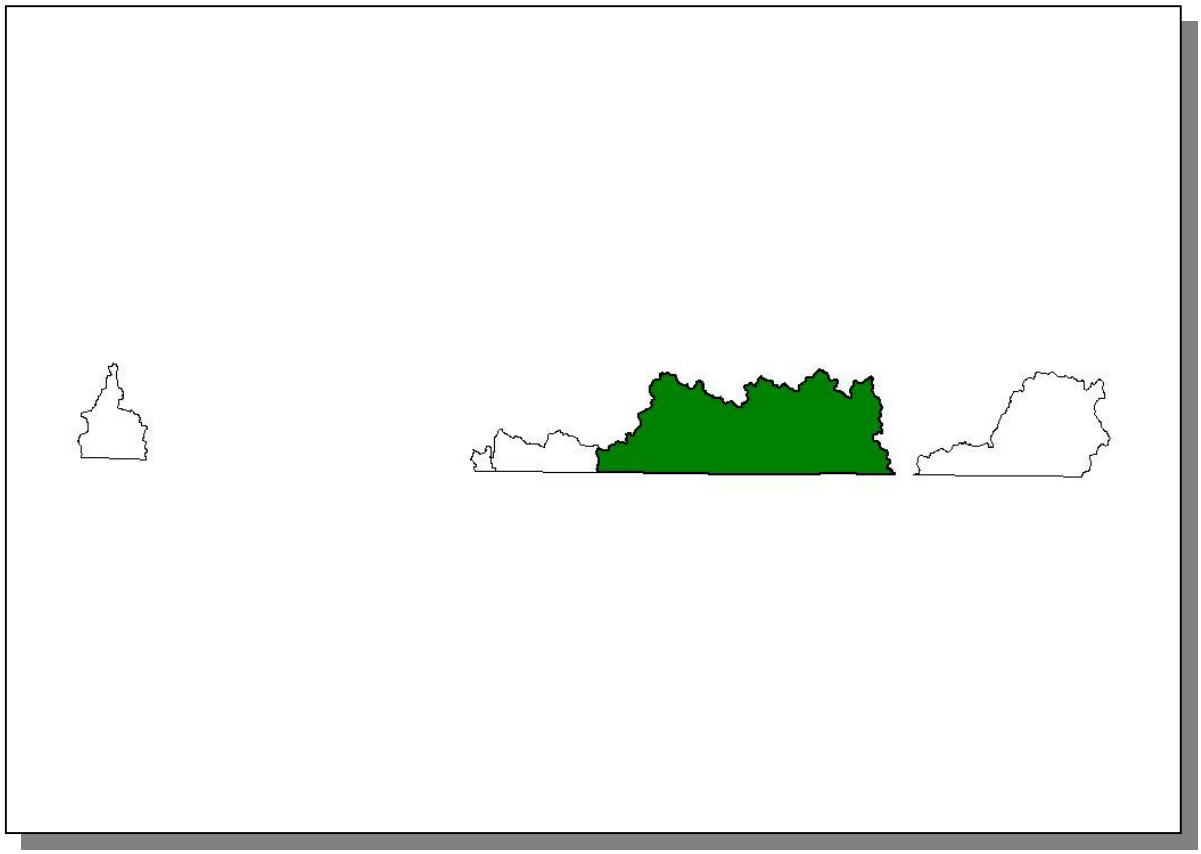

Figure 4-6. Location of Subwatershed 0603000202. *All Wheeler Lake HUC-10 subwatershed boundaries are shown for reference.*

4.2.B.i. General Description.

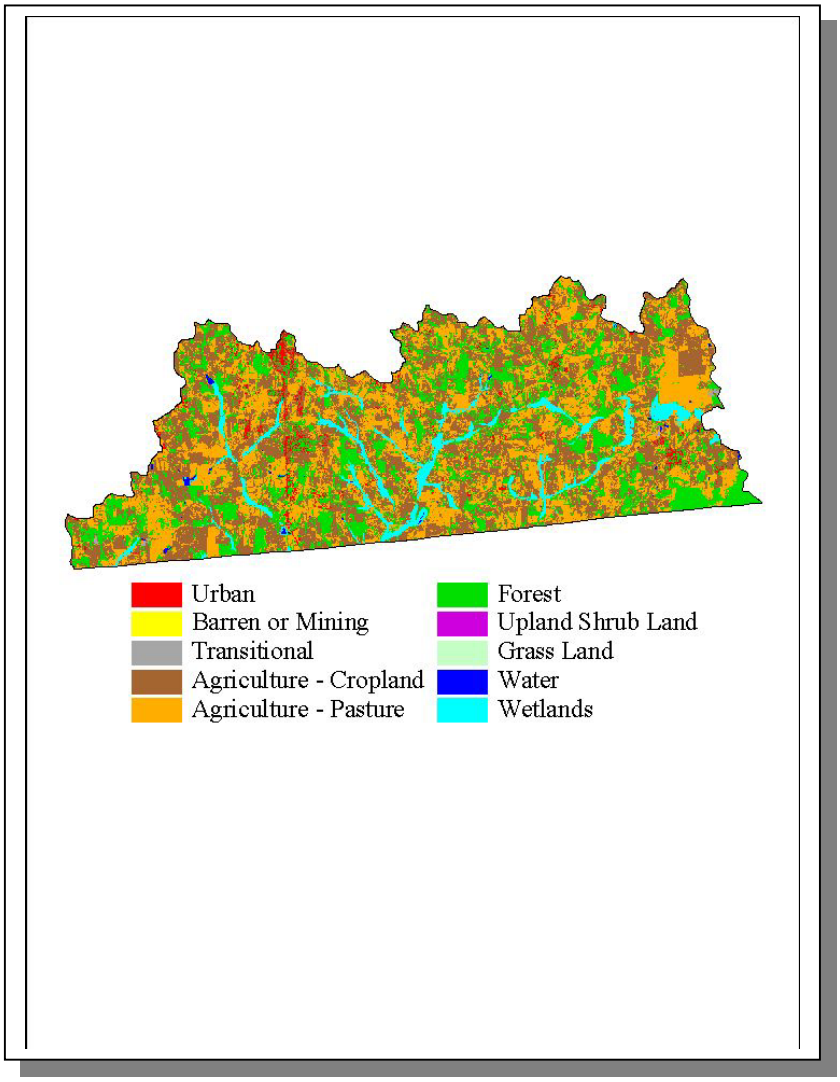

Figure 4-7. Illustration of Land Use Distribution in Subwatershed 0603000202.

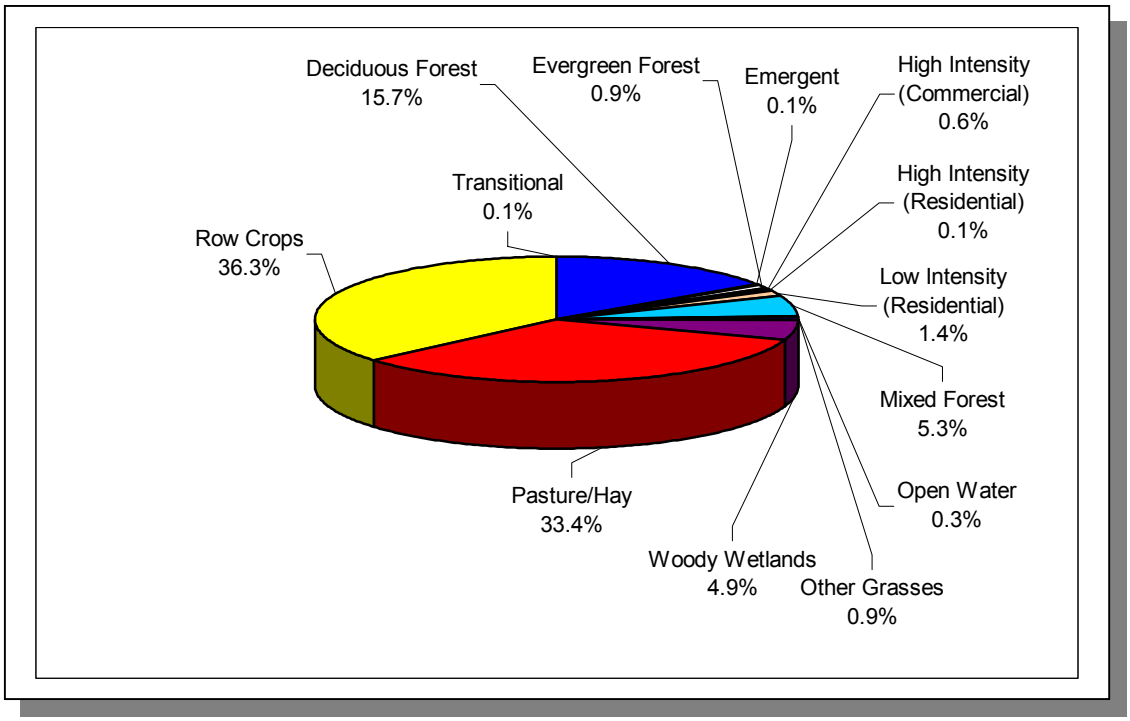

Figure 4-8. Land Use Distribution in Subwatershed 0603000202. *More information is provided in Wheekler -Appendix IV.*

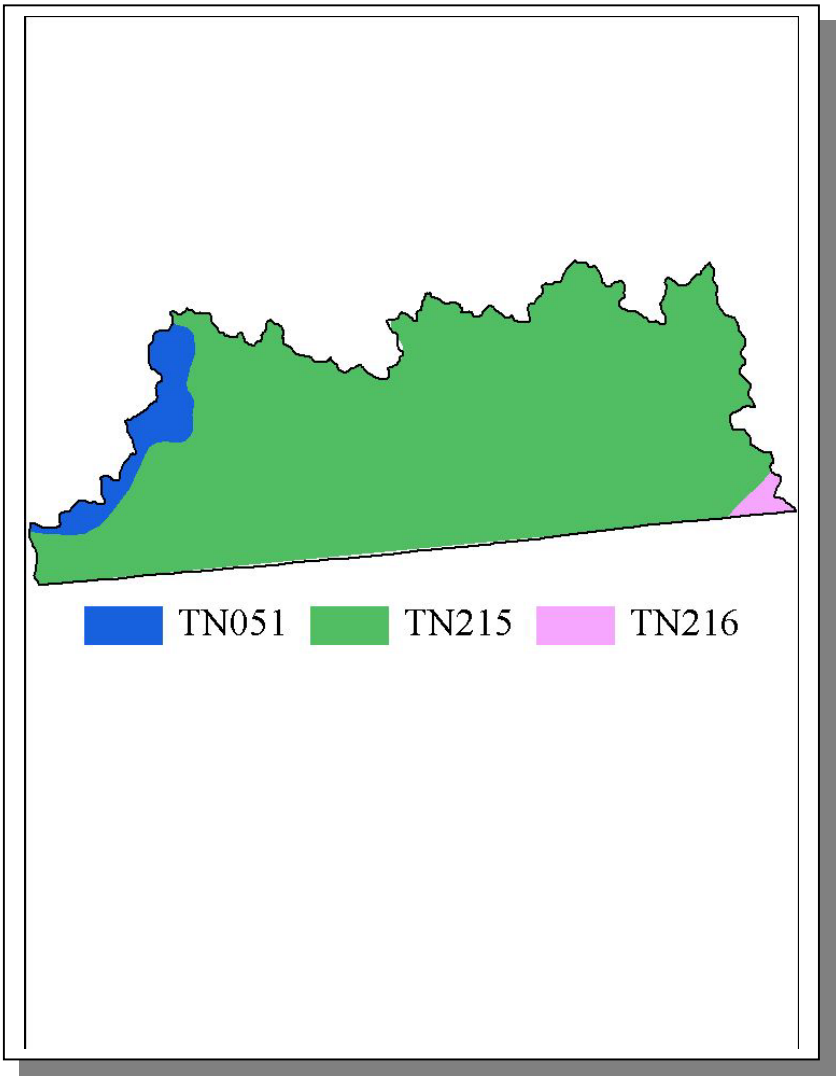

Figure 4-9. STATSGO (State Soil Geographic Database) Soil Map Units in Tennessee Portion of Subwatershed 0603000202.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN051	1.00	C	1.73	5.44	Loam	0.33
TN066	0.00	B	2.62	4.75	Loam	0.28
TN215	9.00	C	1.57	5.02	Silty Loam	0.39
TN216	0.00	C	2.51	4.59	Loam	0.25

Table 4-7. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Tennessee Portion of Subwatershed 0603000202. *More information is provided in Wheeler-Appendix IV.*

	COUNTY POPULATION			ESTIMATED POPULATION IN WATERSHED		PERCENT CHANGE
County	1990	1997 Est.	Portion of Watershed (%)	1990	1997	
Lincoln	18,157	29,336	19.77	5,565	5,798	4.2

Table 4-8. Population Estimates in Tennessee Portion of Subwatershed 0603000202.

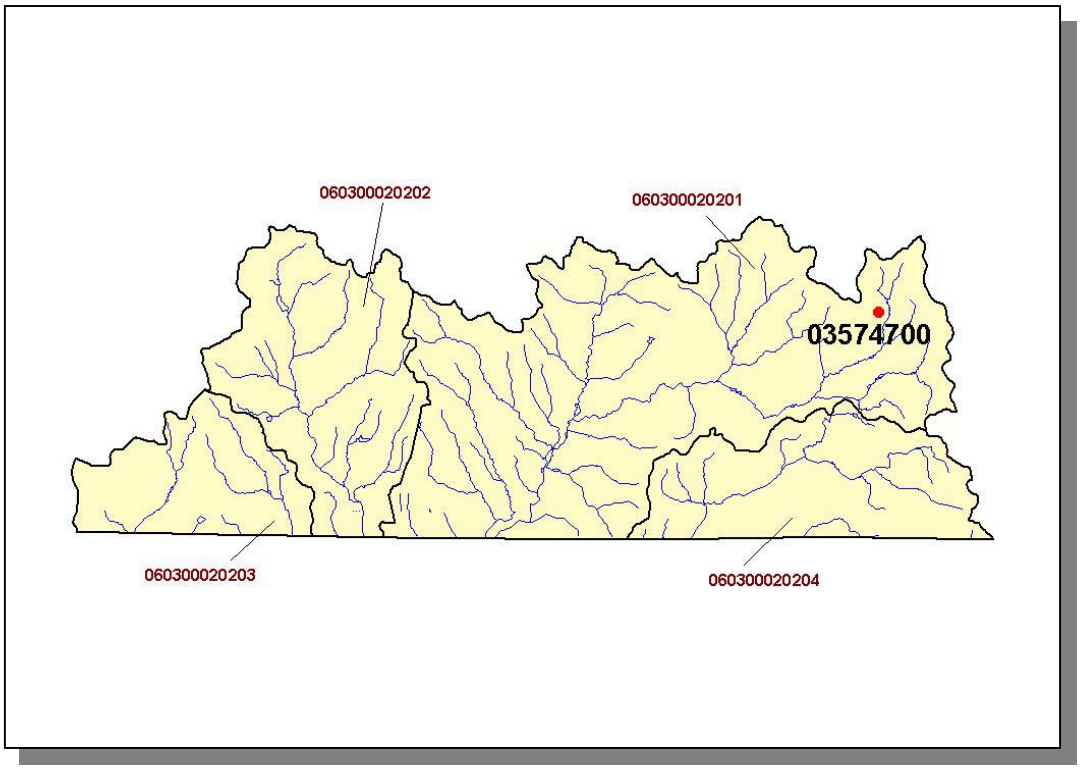

Figure 4-10. Location of Historical Streamflow Data Collection Sites in Tennessee Portion of Subwatershed 0603000202. *Subwatershed 060300020201, 060300020202, 060300020203, and 060300020204 boundaries are shown for reference. More information is provided in Wheeler -Appendix IV.*

4.2.B.ii. Point Source Contributions.

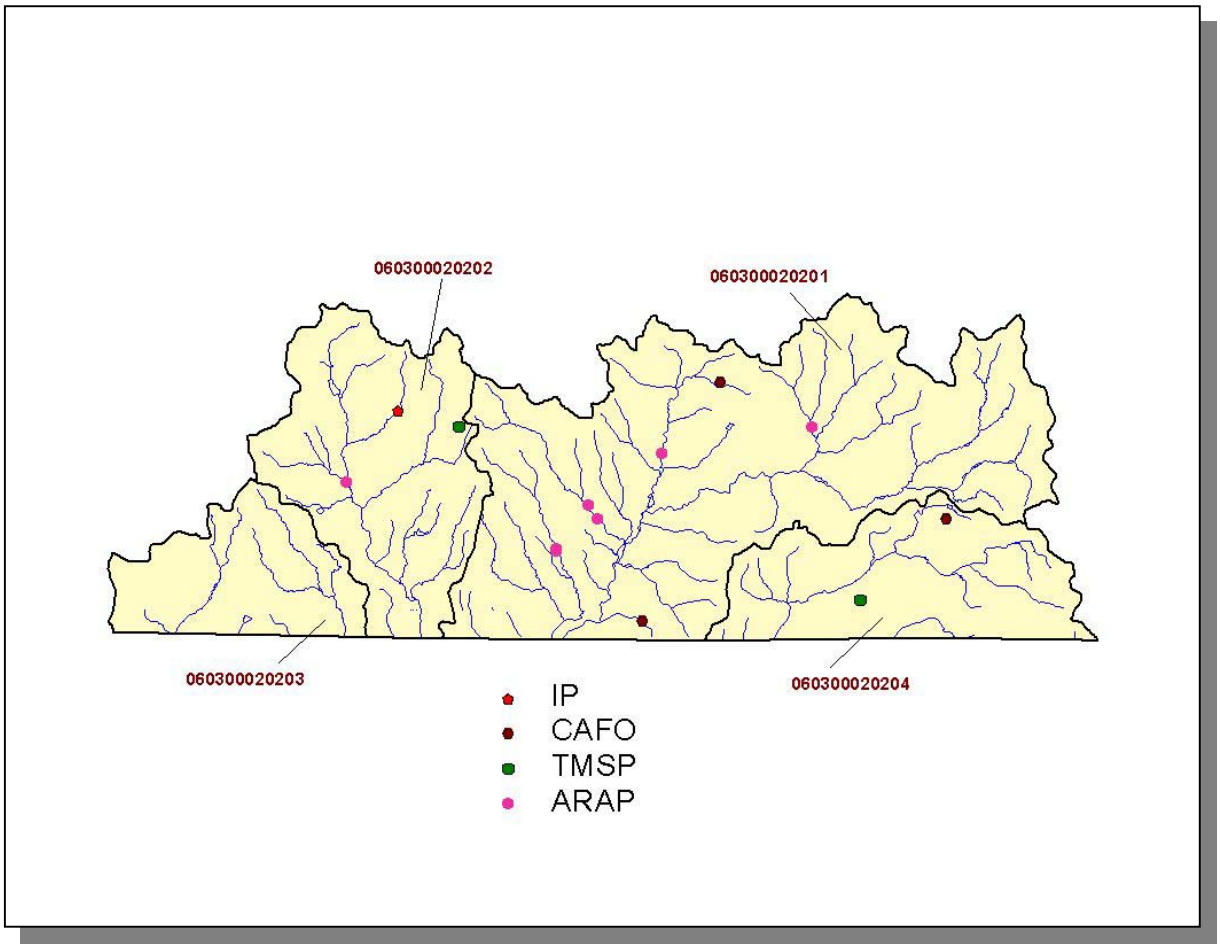

Figure 4-11. Location of Active Point Source Facilities in Tennessee Portion of Subwatershed 0603000202. *Subwatershed 060300020201, 060300020202, 060300020203, and 060300020204 boundaries are shown for reference. More information is provided in the following charts.*

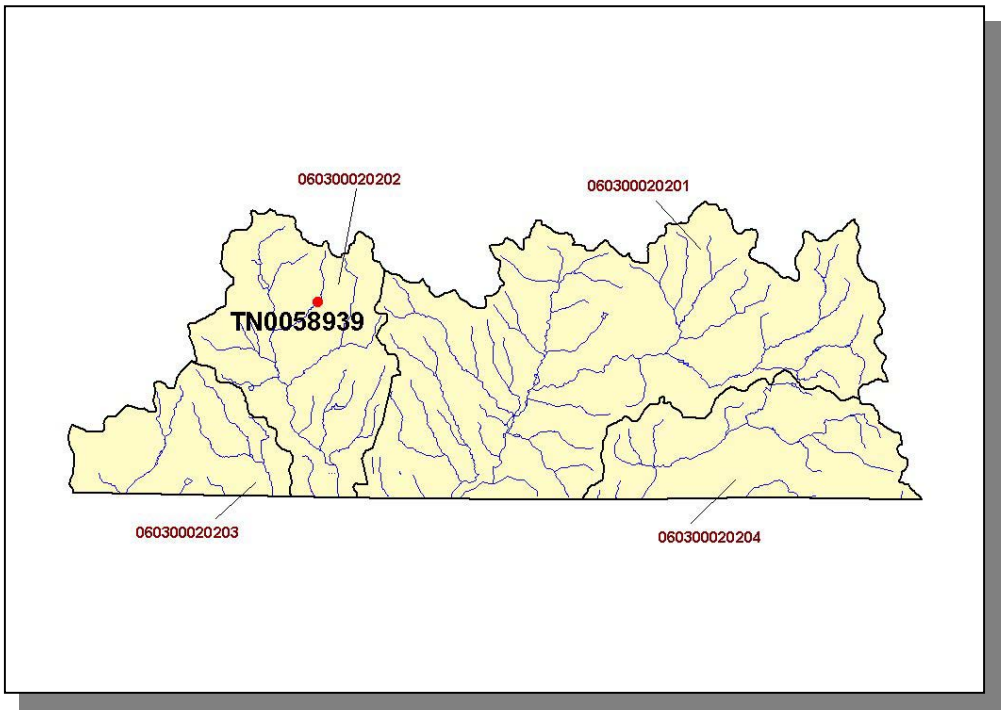

Figure 4-12. Location of Active Point Source Facilities (Individual Permits) in Tennessee Portion of Subwatershed 0603000202. *Subwatershed 060300020201, 060300020202, 060300020203, and 060300020204 boundaries are shown for reference. More information, including the names of facilities, is provided in Wheeler-Appendix IV.*

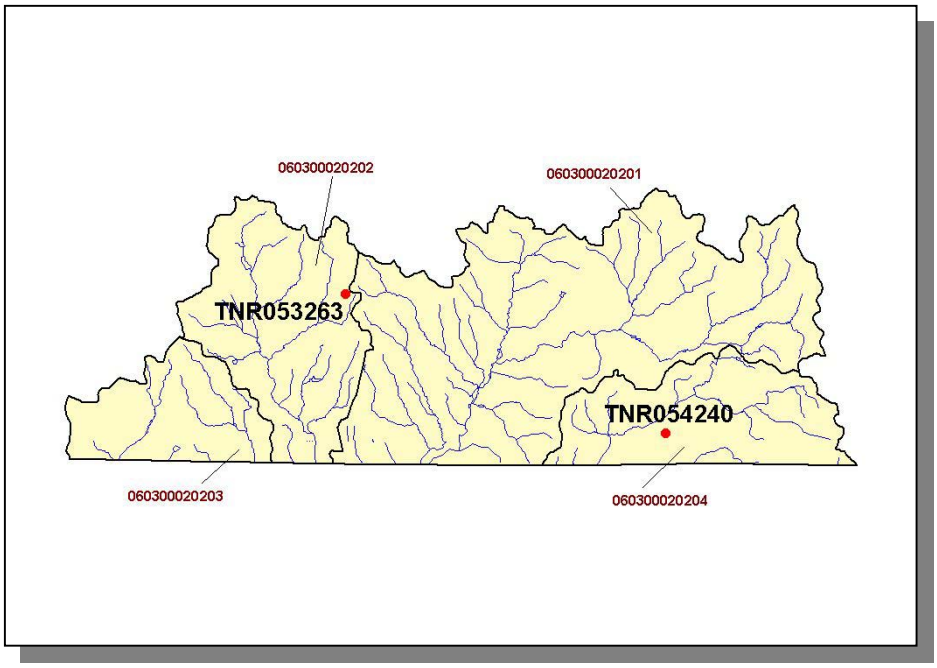

Figure 4-13. Location of TMSP Facilities in Tennessee Portion of Subwatershed 0603000202. *Subwatershed 060300020201, 060300020202, 060300020203, and 060300020204 boundaries are shown for reference. More information, including the names of facilities, is provided in Wheeler-Appendix IV.*

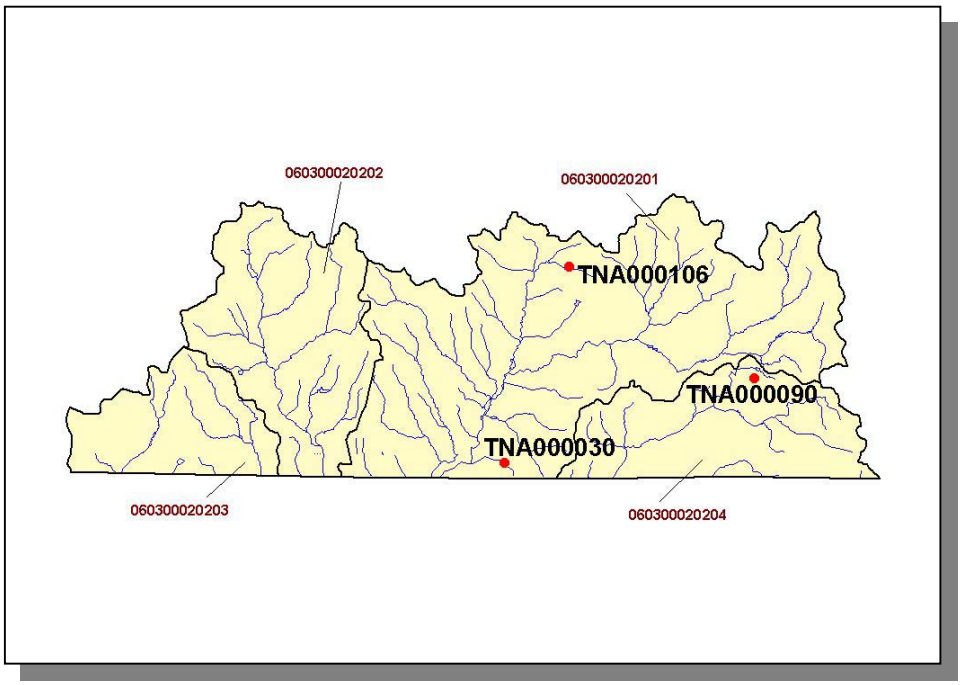

Figure 4-14. Location of CAFO Facilities in Tennessee Portion of Subwatershed 0603000202. *Subwatershed 060300020201, 060300020202, 060300020203, and 060300020204 boundaries are shown for reference. CAFO rules may be found at http://cfpub.epa.gov/npdes/afo/cafofinalrule.cfm. More information, including the names of facilities, is provided in Wheeler-Appendix IV.*

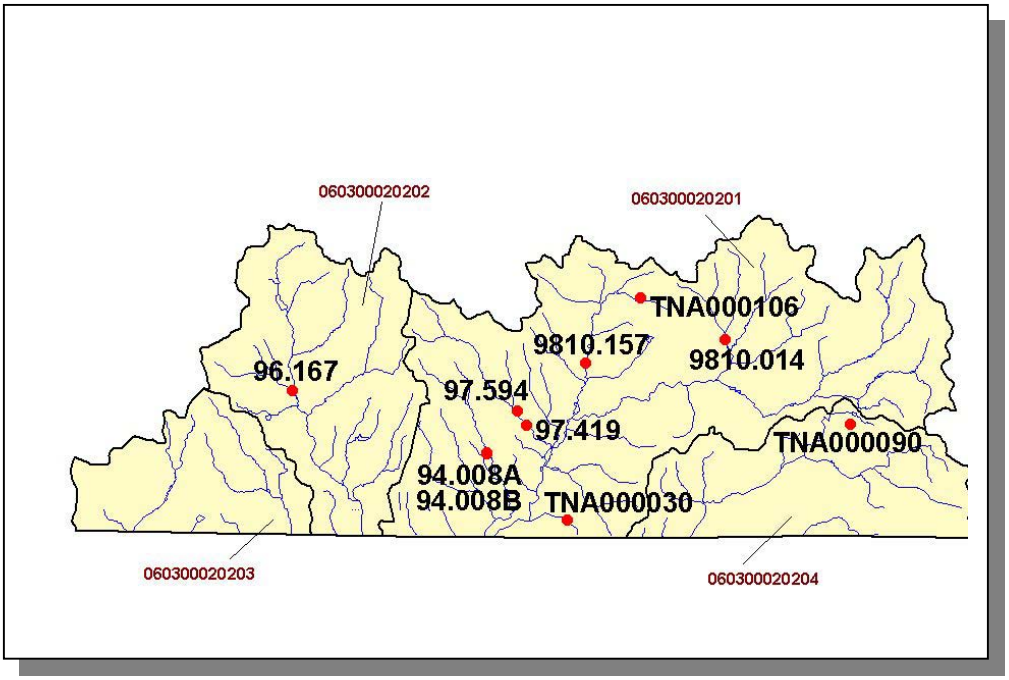

Figure 4-15. Location of ARAP Sites (Individual Permits) in Tennessee Portion of Subwatershed 0603000202. *Subwatershed 060300020201, 060300020202, 060300020203, and 060300020204 boundaries are shown for reference. More information, including the names of facilities, is provided in Wheeler-Appendix IV.*

4.2.B.iii. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens	Chickens Sold	Hogs	Sheep
9,212	18,601	1,208	16	1,385,006	1,031	140

Table 4-9. Summary of Livestock Count Estimates in Tennessee Portion of Subwatershed 0603000202. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Lincoln	136.7	136.7	1.1	3.2

Table 4-10. Forest Acreage and Average Annual Removal Rates (1987-1994) in Tennessee Portion of Subwatershed 0603000202.

CROPS	TONS/ACRE/YEAR
Legume/Grass (Hayland)	0.37
Legume (Hayland)	0.12
Grass (Hayland)	0.22
Grass (Pastureland)	1.13
Grass, Forbs, Legumes (Mixed Pasture)	0.95
Forest Land (Grazed)	0.00
Forest Land (Not Grazed)	0.00
Corn (Row Crops)	3.68
Soybeans (Row Crops)	7.21
Potatoes (Row Crops)	3.04
Tobacco (Row Crops)	9.27
Wheat (Close Grown Cropland)	3.28
Conservation Reserve Program Lands	0.30
Other Land in Farms (Other Farmland)	0.28
Other Vegetable and Truck Crops	2.52
Farmsteads and Ranch Headquarters	0.41

Table 4-11. Annual Estimated Total Soil Loss in Tennessee Portion of Subwatershed 0603000202.

4.2.C. 0603000206.

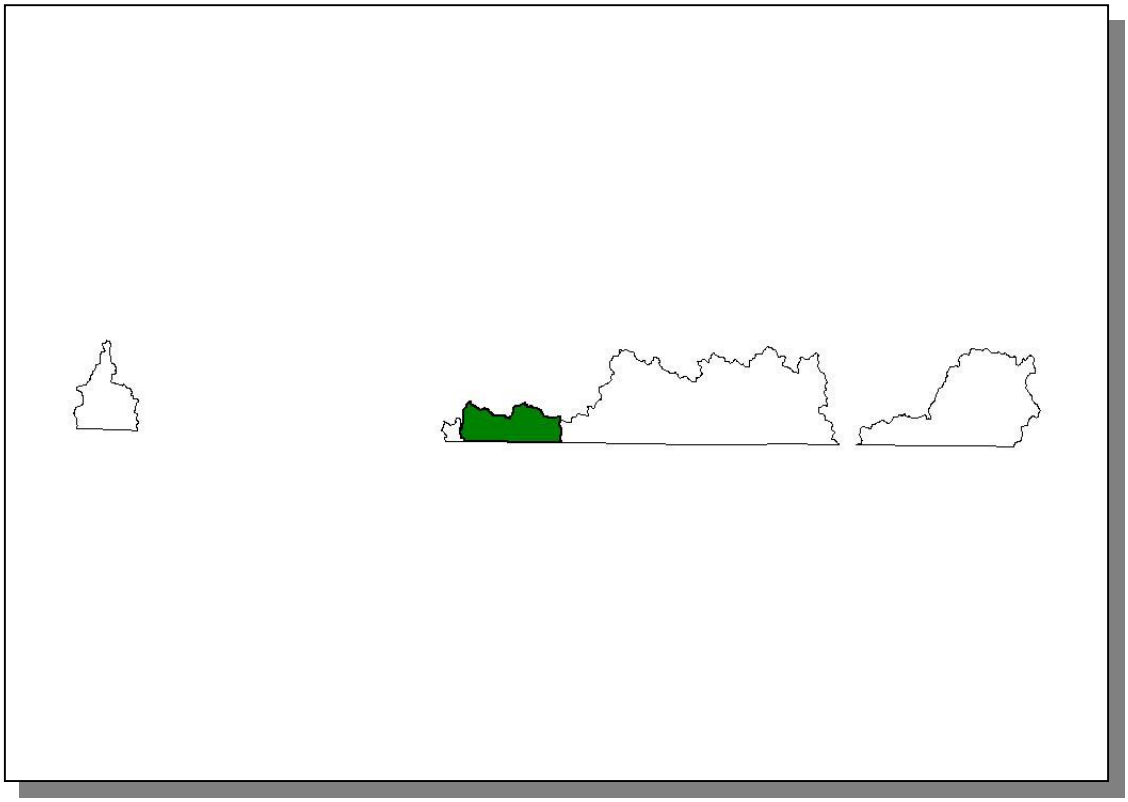

Figure 4-16. Location of Tennessee Portion of Subwatershed 0603000206. *All Wheeler Lake HUC-10 subwatershed boundaries are shown for reference.*

4.2.C.i. General Description.

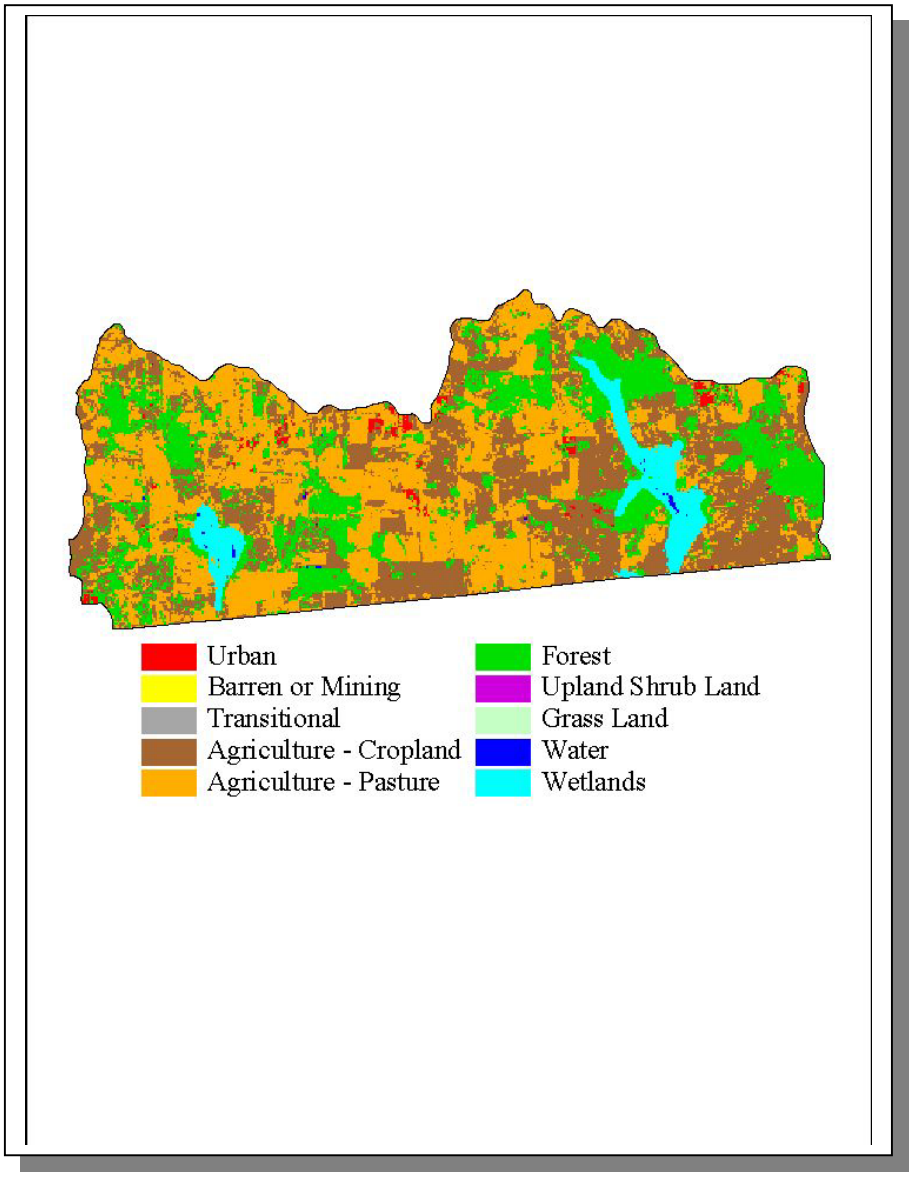

Figure 4-17. Illustration of Land Use Distribution in Subwatershed 0603000206.

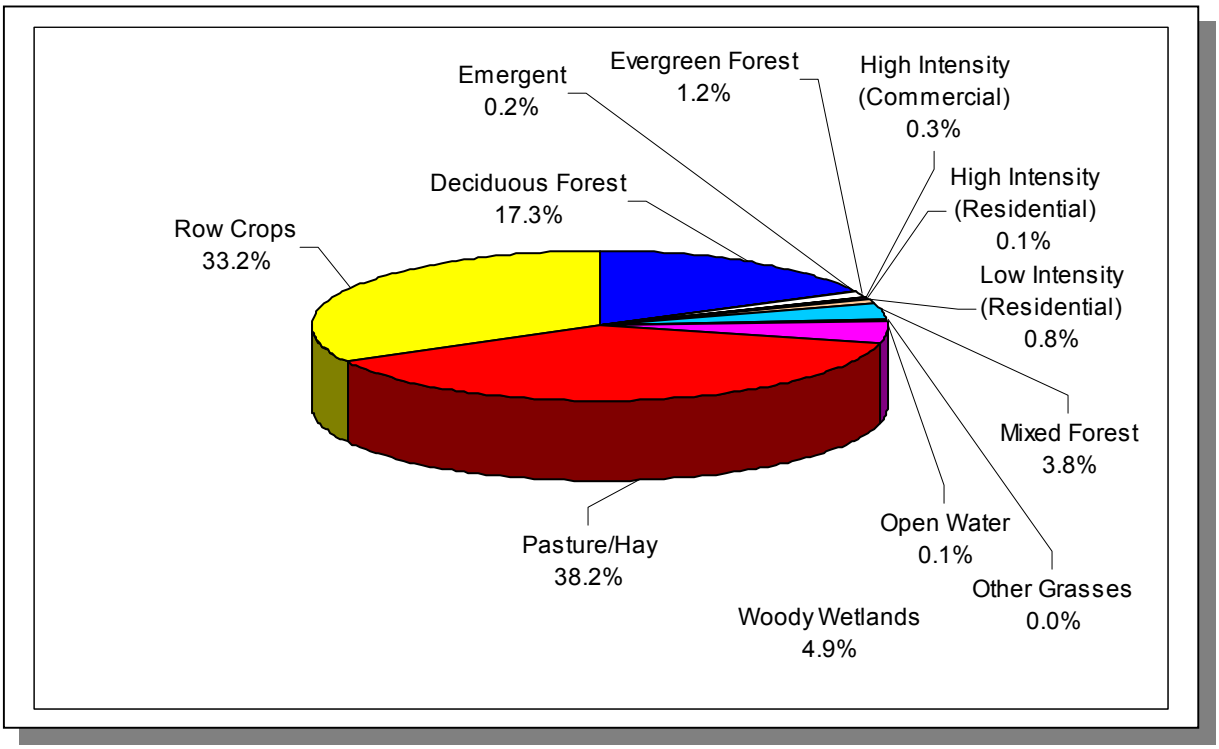

Figure 4-18. Land Use Distribution in Tennessee Portion of Subwatershed 0603000206. *More information is provided in Wheeler-Appendix IV.*

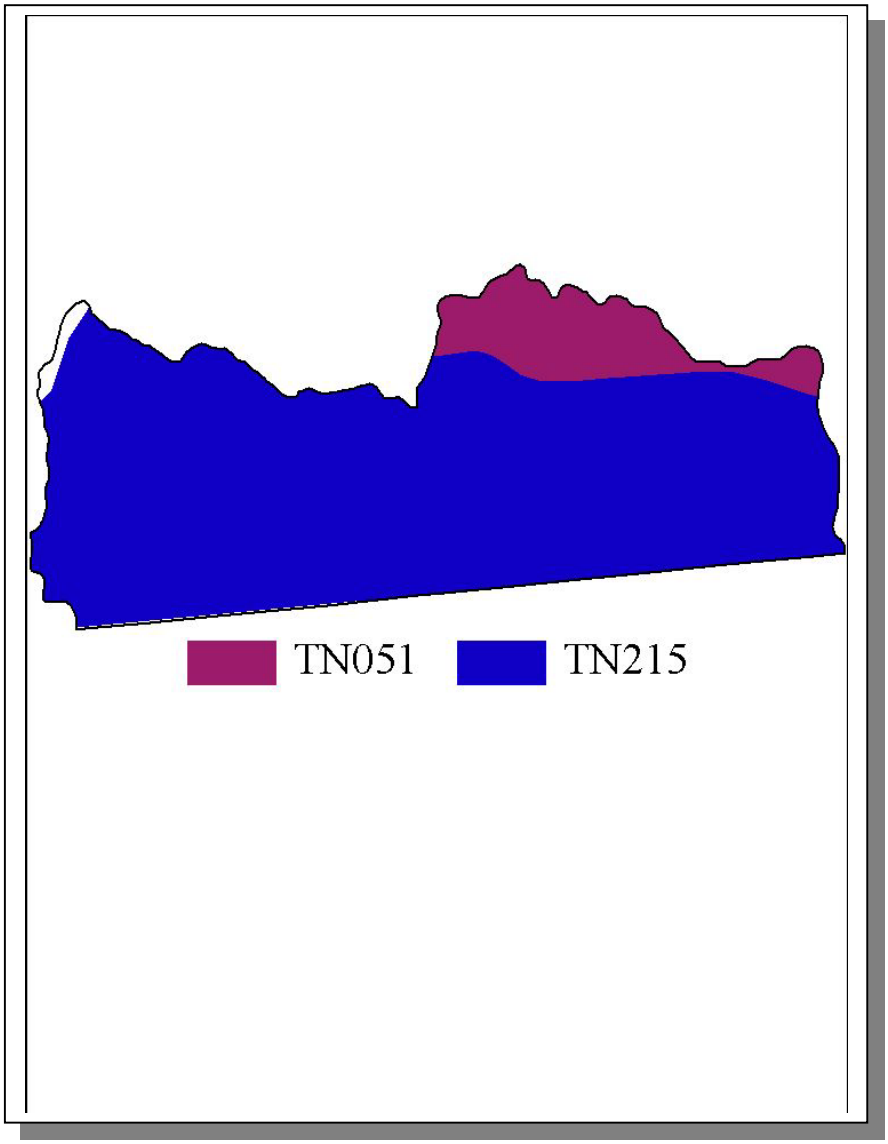

Figure 4-19. STATSGO (State Soil Geographic Database) Soil Map Units in Tennessee Portion of Subwatershed 0603000206.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN051	1.00	C	1.73	5.44	Loam	0.33
TN066	0.00	B	2.62	4.75	Loam	0.28
TN215	9.00	C	1.57	5.02	Silty Loam	0.39

Table 4-12. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Tennessee Portion of Subwatershed 0603000206. *More information is provided in Wheeler-Appendix IV.*

	COUNTY POPULATION			ESTIMATED POPULATION IN WATERSHED		% CHANGE
County	1990	1997 Est.	Portion of Watershed (%)	1990	1997	
Giles	25,741	28,515	0.11	27	30	11.1
Lincoln	28,157	29,336	2.68	753	785	4.2
Total	**53,898**	**57,851**		**780**	**815**	**4.5**

Table 4-13. Population Estimates in Tennessee Portion of Subwatershed 0603000206.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Ardmore	Giles	828	342	192	150	0

Table 4-14. Housing and Sewage Disposal Practices of Select Communities in Tennessee Portion of Subwatershed 0603000206.

4.2.C.ii. Point Source Contributions.

There are no Point Source contributions in subwatershed 0603000206.

4.2.C.iii. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens	Chickens Sold	Hogs	Sheep
1,568	3,165	195	<5	237,801	183	24

Table 4-15. Summary of Livestock Count Estimates in Tennessee Portion of Subwatershed 0603000206. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Giles	171.8	171.8	3.3	11.4
Linciln	136.7	136.7	1.1	3.2
Totals	**308.5**	**308.5**	**4.4**	**14.6**

Table 4-16. Forest Acreage and Average Annual Removal Rates (1987-1994) in Tennessee Portion of Subwatershed 0603000206.

CROPS	TONS/ACRE/YEAR
Legume (Hayland)	0.12
Grass (Hayland)	0.22
Legume/Grass (Hayland)	0.36
Grass (Pastureland)	1.13
Grass, Forbs, Legumes (Mixed Pasture)	0.94
Forest Land (Grazed)	0.00
Forest Land (Not Grazed)	0.00
Soybeans (Row Crops)	7.05
Corn (Row Crops)	3.70
Tobacco (Row Crops)	9.27
Potatoes (Row Crops)	3.04
All Other Row Crops	2.70
Wheat (Close Grown Cropland)	3.22
Barley (Close Grown Cropland)	1.08
Conservation Reserve Program Land	0.30
Other Vegetable and Truck Crops	2.59
Fruit (Horticulture)	0.09
Summer Fallow (Other Cropland)	0.35
Other Land in Farms	0.28
Farmsteads and Ranch Headquarters	0.40
Other Cropland not Planted	0.25

Table 4-17. Annual Estimated Total Soil Loss in Tennessee Portion of Subwatershed 0603000206.

4.2.D. 0603000208.

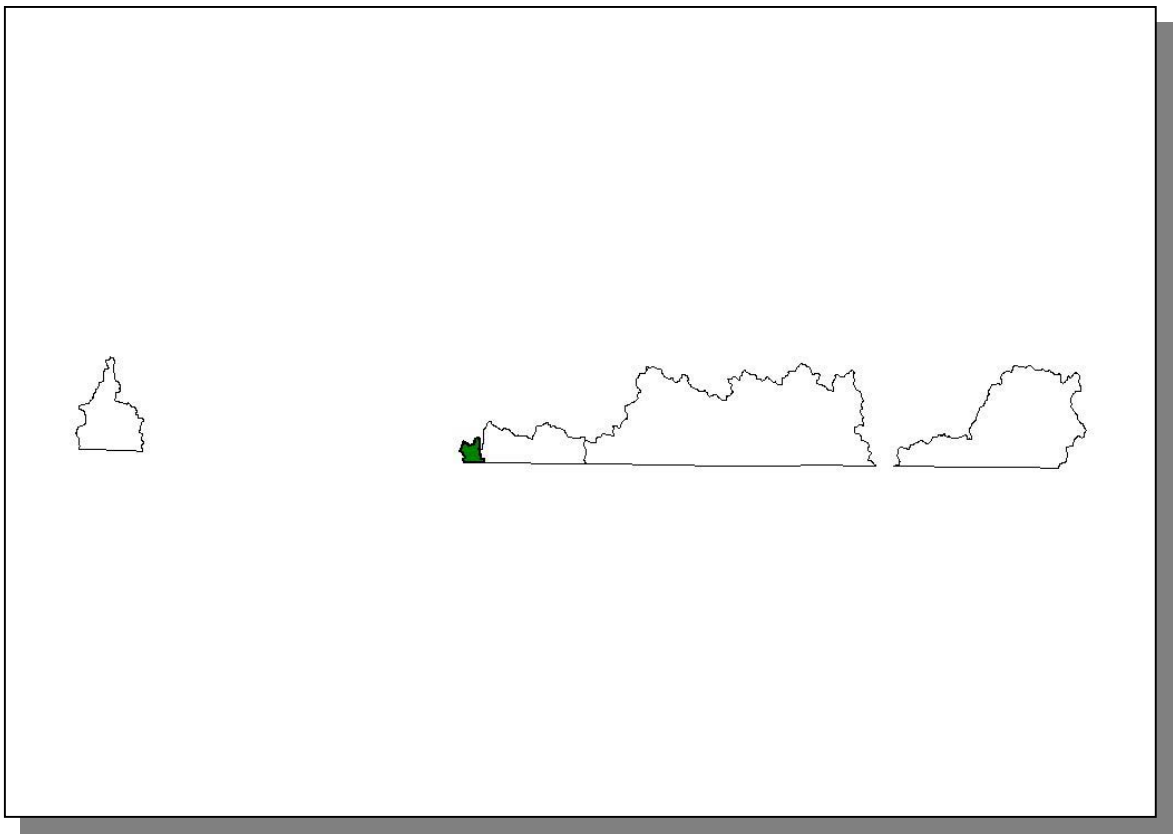

Figure 4-20. Location of Tennessee Portion of Subwatershed 0603000208. *All Wheeler Lake HUC-10 subwatershed boundaries are shown for reference.*

4.2.D.i. General Description.

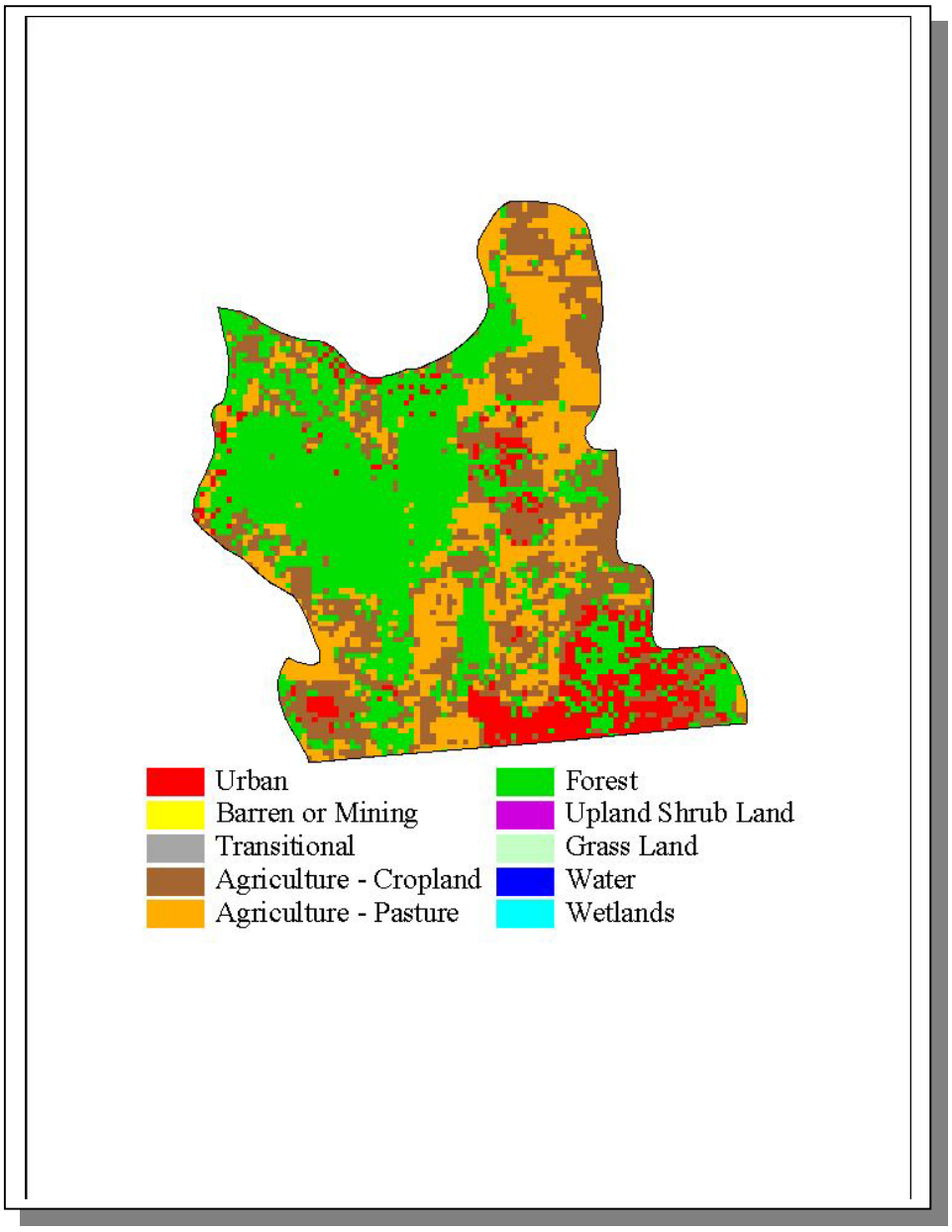

Figure 4-21. Illustration of Land Use Distribution in Subwatershed 0603000208.

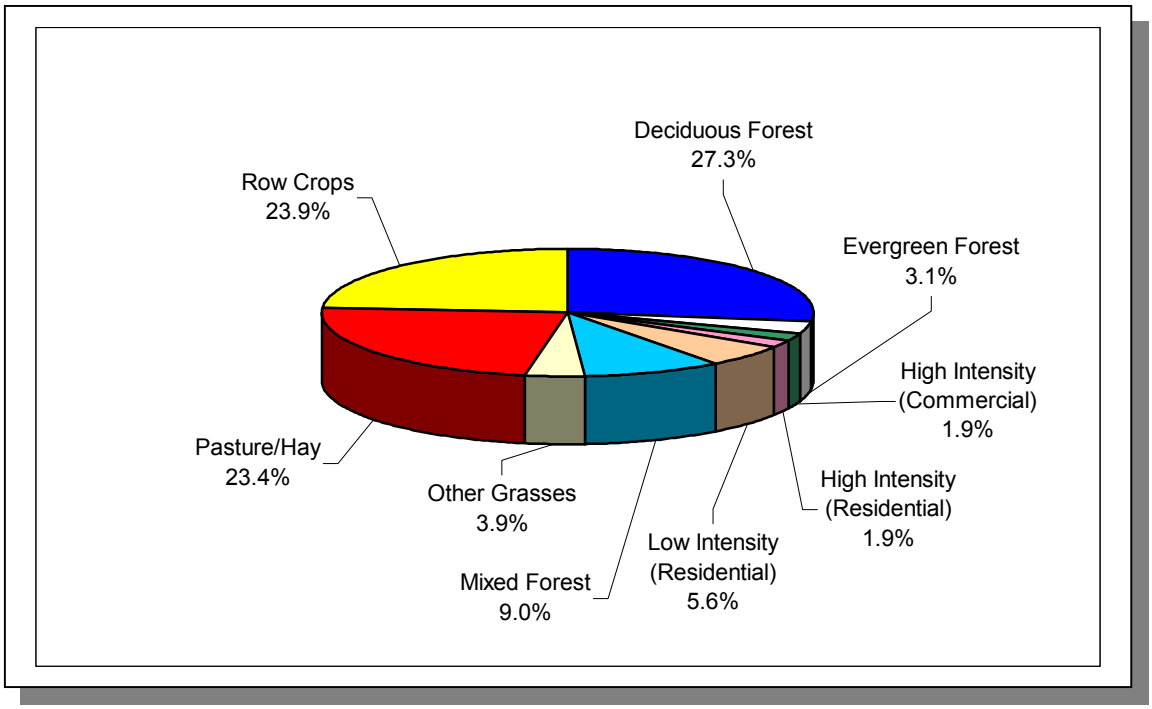

Figure 4-22. Land Use Distribution in Tennessee Portion of Subwatershed 0603000208. *More information is provided in Wheeler-Appendix IV.*

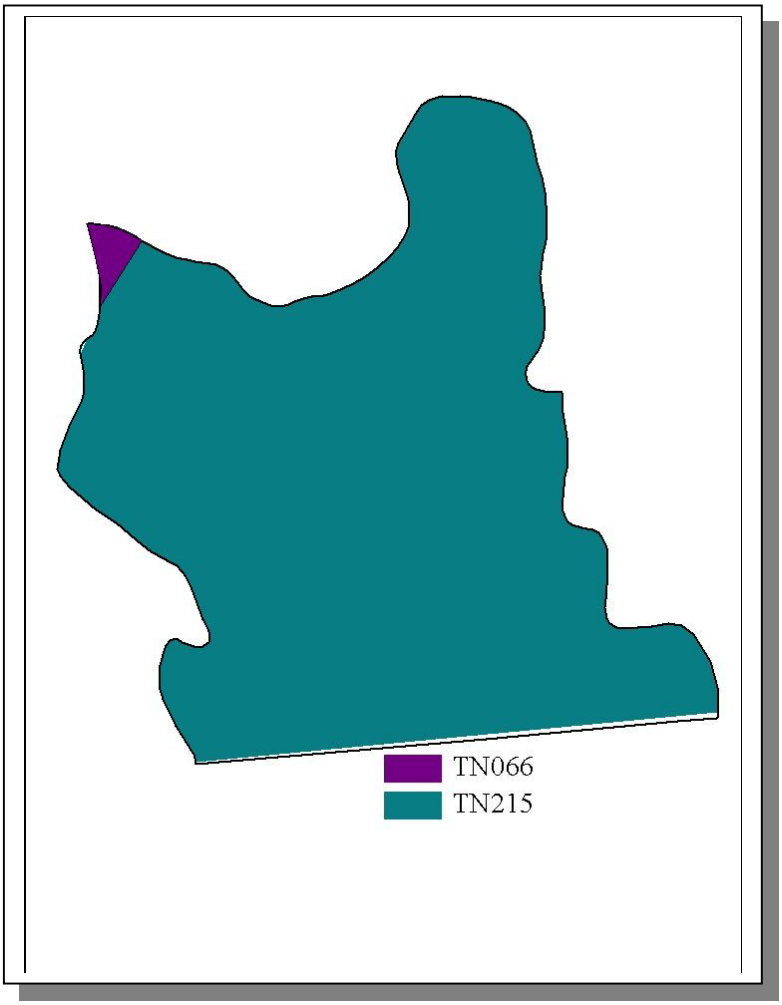

Figure 4-23. STATSGO (State Soil Geographic Database) Soil Map Units in Tennessee Portion of Subwatershed 0603000208.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN066	0.00	B	2.62	4.75	Loam	0.28
TN215	9.00	C	1.57	5.02	Silty Loam	0.39

Table 4-18. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Tennessee Portion of Subwatershed 0603000208. *More information is provided in Wheeler-Appendix IV.*

	COUNTY POPULATION			ESTIMATED POPULATION IN WATERSHED		PERCENT CHANGE
County	1990	1997 Est.	Portion of Watershed (%)	1990	1997	
Giles	25,741	28,515	0.23	60	66	10.0

Table 4-19. Population Estimates in Tennessee Portion of Subwatershed 0603000208.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Ardmore	Giles	828	342	192	150	0

Table 4-20. Housing and Sewage Disposal Practices of Select Communities in Tennessee Portion of Subwatershed 0603000208.

4.2.D.ii. Point Source Contributions.

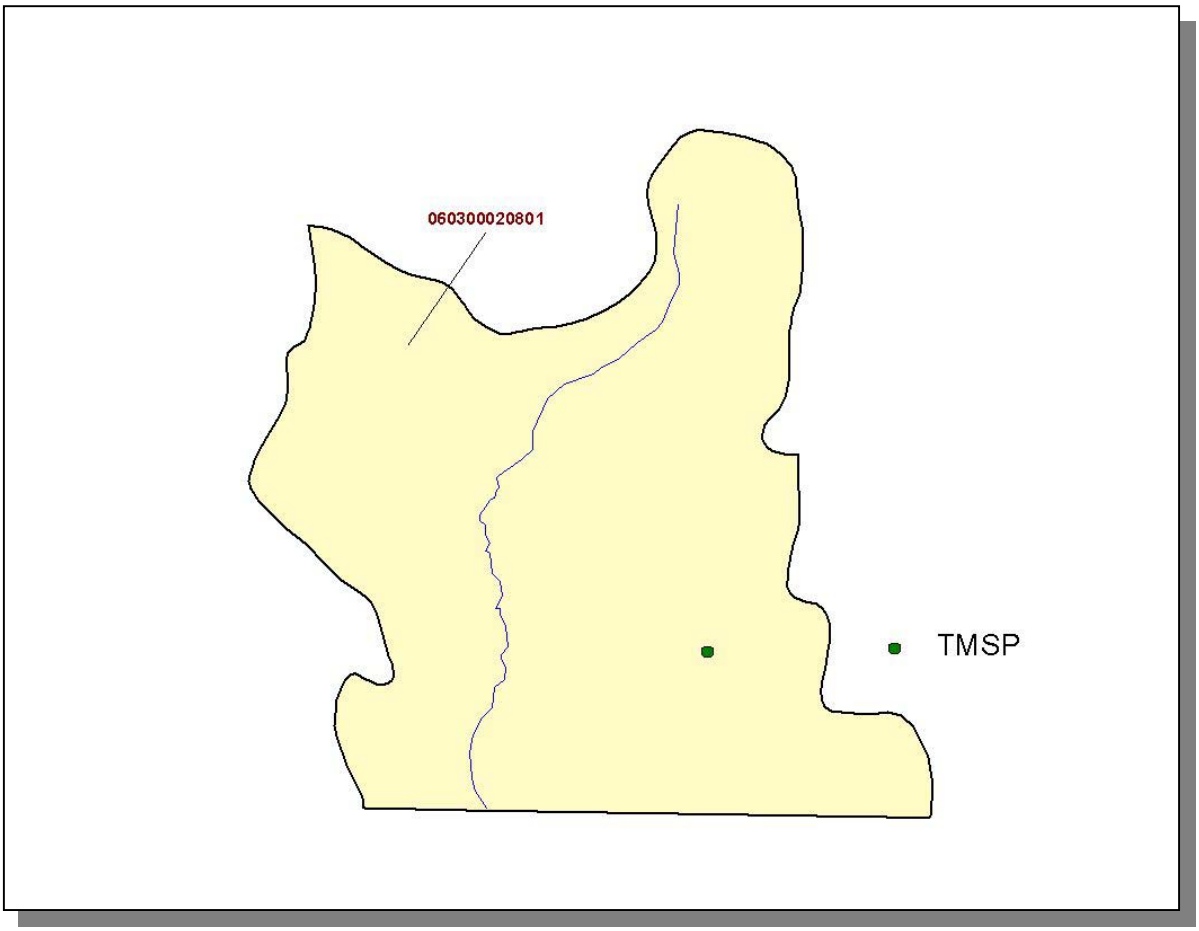

Figure 4-24. Location of Active Point Source Facilities in Tennessee Portion of Subwatershed 08010208. *Subwatershed 060300020801 boundary is shown for reference. More information is provided in the following charts.*

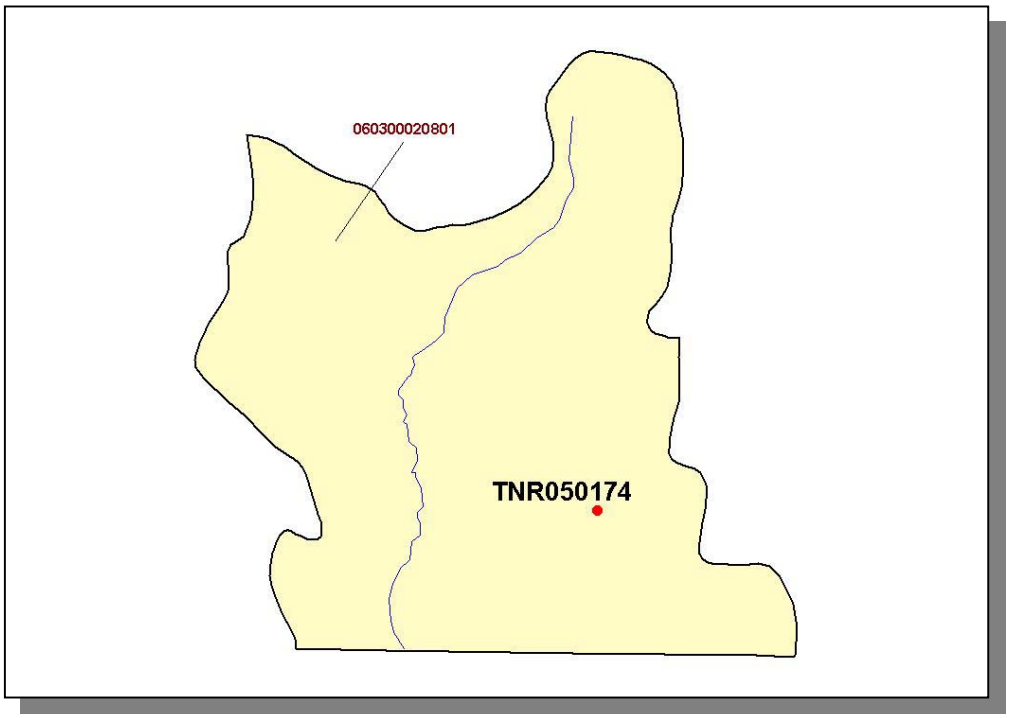

Figure 4-25. Location of TMSP Facilities in Tennessee Portion of Subwatershed 0603000208. *Subwatershed 060300020801 boundary is shown for reference. More information is provided in Wheeler-Appendix IV.*

4.2.D.iii. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Milk Cow	Cattle	Chickens	Chickens Sold	Hogs	Sheep
109	9	238	0	5,456	30	1

Table 4-21. Summary of Livestock Count Estimates in Tennessee Portion of Subwatershed 0603000208. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Giles	**171.8**	**171.8**	**3.3**	**11.4**

Table 4-22. Forest Acreage and Average Annual Removal Rates (1987-1994) in Tennessee Portion of Subwatershed 0603000208.

CROPS	TONS/ACRE/YEAR
Forest Land (Grazed)	0.00
Forest Land (Not Grazed)	0.00
Corn (Row Crops)	4.21
Soybeans (Row Crops)	3.14
All Other Row Crops	2.70
Wheat (Close Grown Cropland)	1.90
Barley (Close Grown Cropland)	1.08
Summer Fallow (Other Cropland)	0.35
Grass (Hayland)	0.21
Legume/Grass (Hayland)	0.10
Grass (Pastureland)	1.05
Grass, Forbs, Legumes (Mixed Pasture)	0.80
Conservation Reserve Program Land	0.23
Other Vegetable and Truck Crops	4.29
Other Cropland not Planted	0.25
Farmsteads and Ranch Headquarters	0.13

Table 4-23. Annual Soil Loss in Tennessee Portion of Subwatershed 0603000208.

4.2.E. 0603000209.

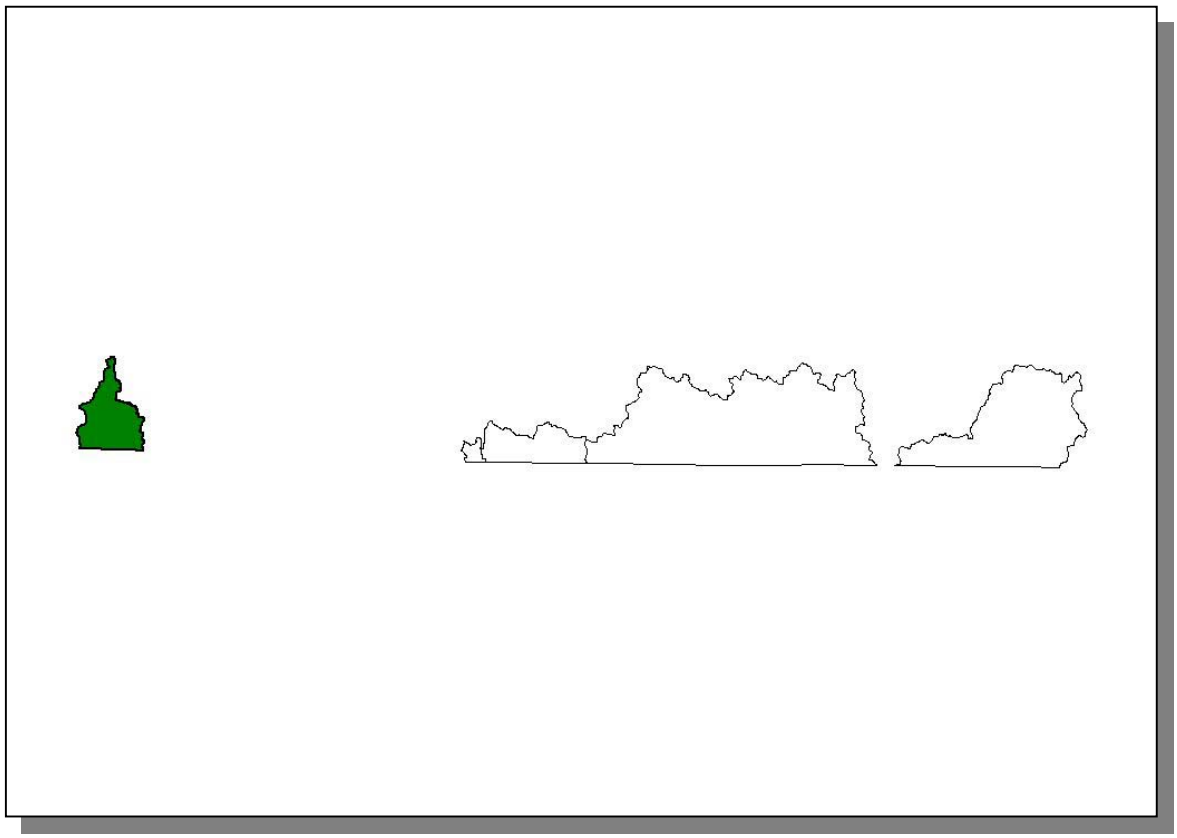

Figure 4-26. Location of Tennessee Portion of Subwatershed 0603000209. *All Wheeler Lake HUC-10 subwatershed boundaries are shown for reference.*

4.2.E.i. General Description.

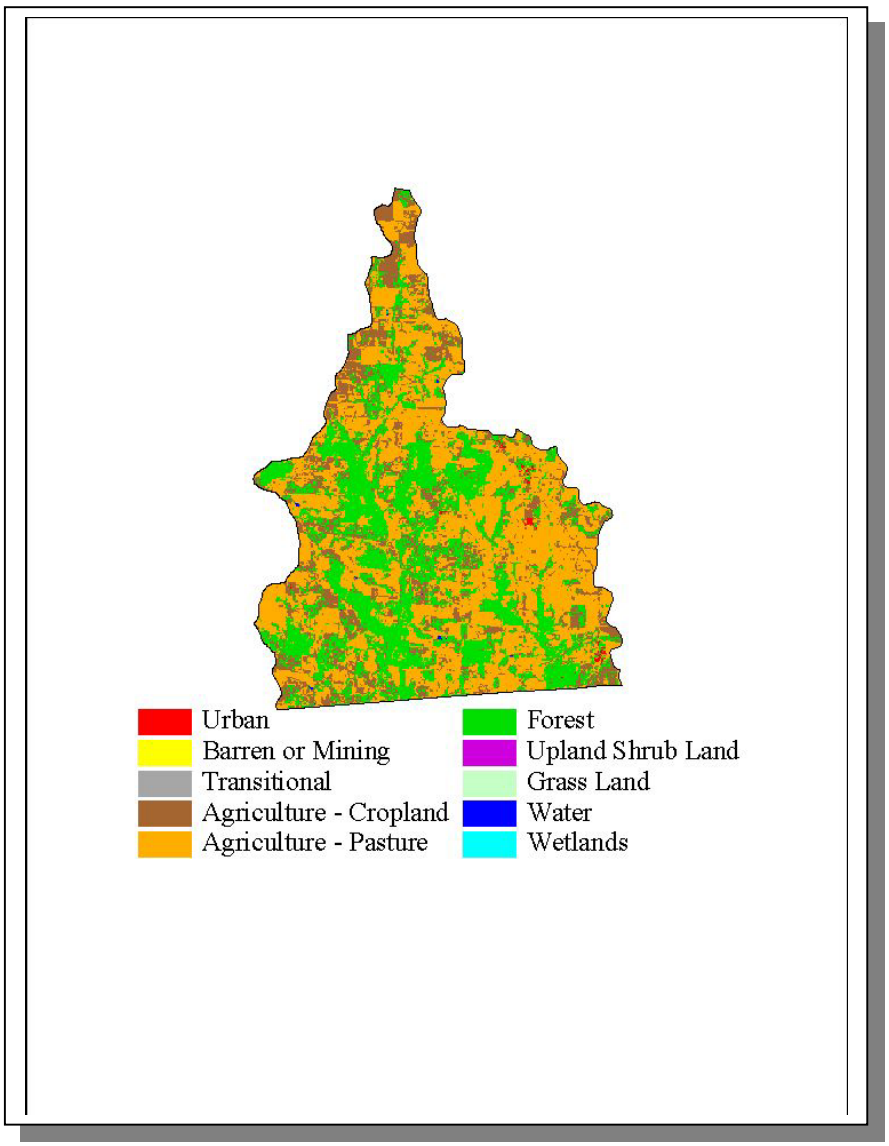

Figure 4-27. Illustration of Land Use Distribution in Subwatershed 0603000209.

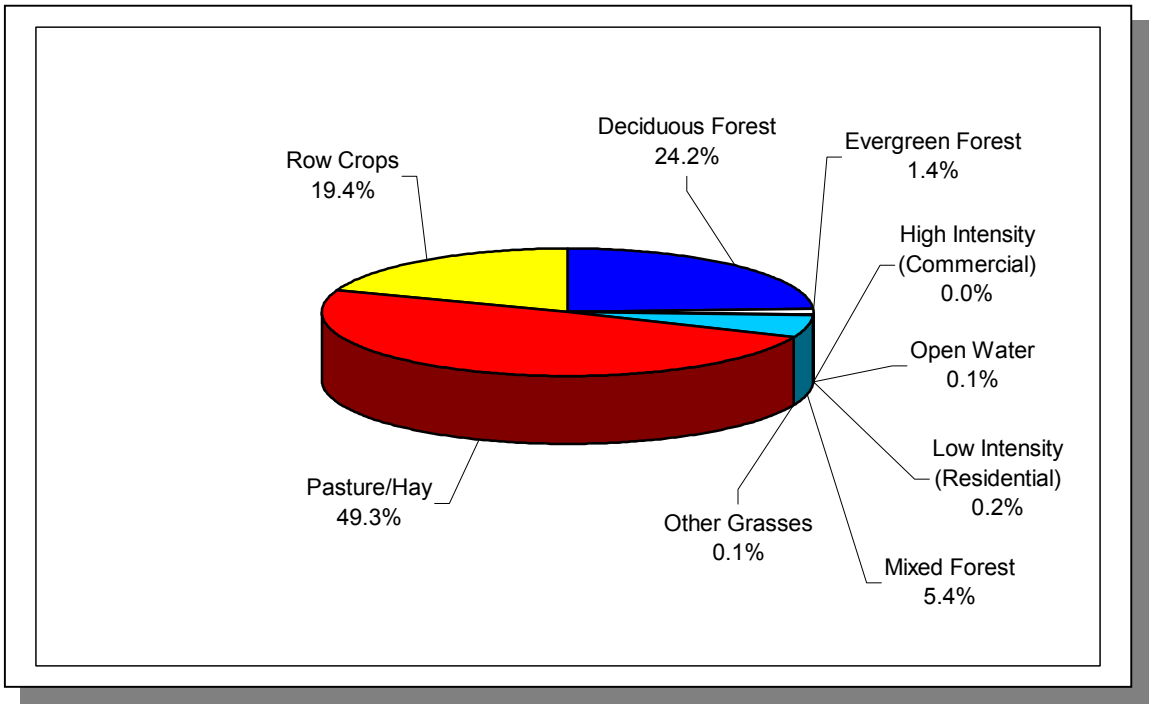

Figure 4-28. Land Use Distribution in Tennessee Portion of Subwatershed 0603000209. *More information is provided in Wheeler-Appendix IV.*

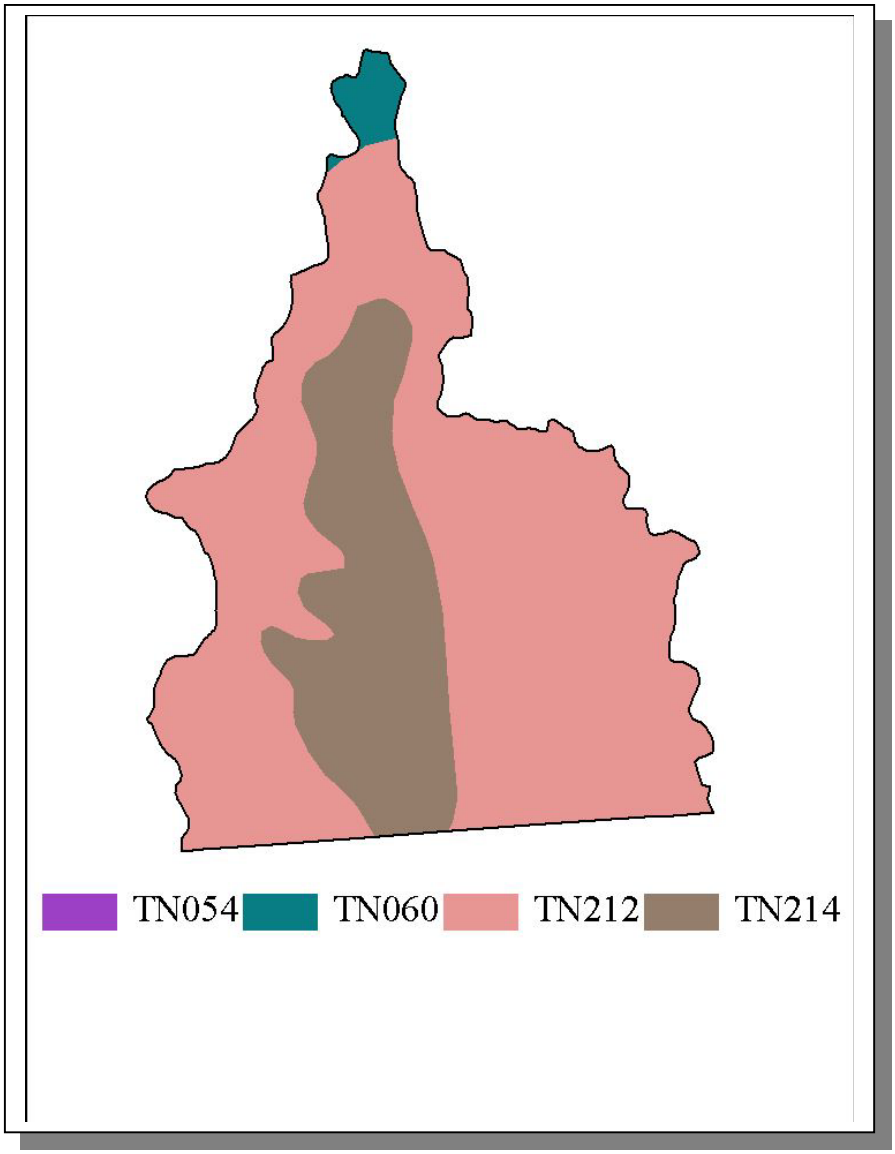

Figure 4-29. STATSGO (State Soil Geographic Database) Soil Map Units in Tennessee Portion of Subwatershed 0603000209.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hr)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN054	0.00	C	3.04	4.84	Loam	0.32
TN060	5.00	B	1.30	5.32	Silty Loam	0.39
TN212	4.00	B	1.95	5.04	Silty Loam	0.38
TN214	0.00	B	2.52	4.86	Loam	0.32

Table 4-24. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Tennessee Portion of Subwatershed 0603000209. *More information is provided in Wheeler-Appendix IV.*

	COUNTY POPULATION			ESTIMATED POPULATION IN WATERSHED		PERCENT CHANGE
County	1990	1997 Est.	Portion of Watershed (%)	1990	1997	
Lawrence	35,303	39,095	2.81	992	1,099	10.8

Table 4-25. Population Estimates in Tennessee Portion of Subwatershed 0603000209.

4.2.E.ii. Point Source Contributions.

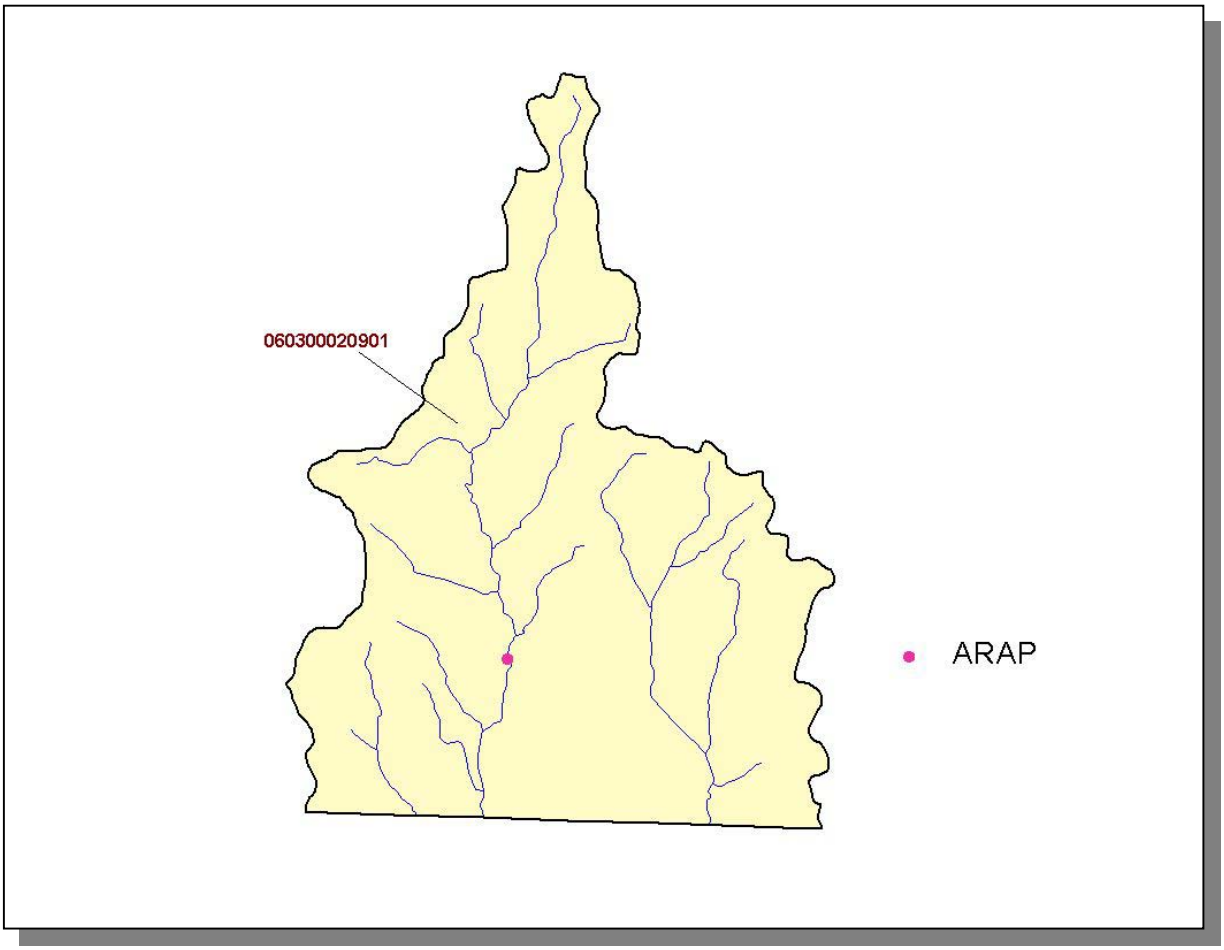

Figure 4-30. Location of Active Point Source Facilities in Tennessee Portion of Subwatershed 0603000209. *Subwatershed 060300020901 boundary is shown for reference. More information is provided in the following charts.*

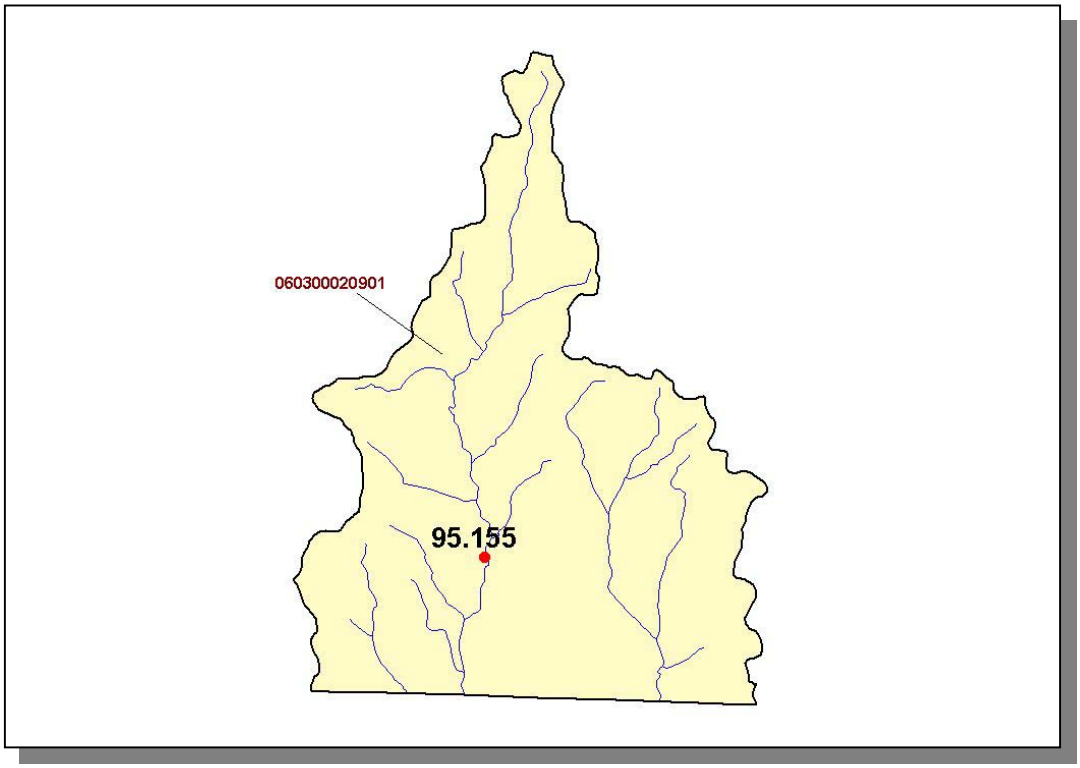

Figure 4-31. Location of ARAP Sites (Individual Permits) in Tennessee Portion of Subwatershed 0603000209. *Subwatershed 060300020901 boundary is shown for reference. More information is provided in Wheeler-Appendix IV.*

4.2.E.iii. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Milk Cow	Cattle	Chickens	Chickens Sold	Hogs	Sheep
3,430	364	6,671	10	42,546	987	31

Table 4-26. Summary of Livestock Count Estimates in Tennessee Portion of Subwatershed 0603000209. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Lawrence	199.8	199.8	6.6	27.1

Table 4-27. Forest Acreage and Annual Removal Rates (1987-1994) in Tennessee Portion of Subwatershed 0603000209.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.24
Grass, Forbs, Legumes (Mixed Pasture)	0.11
Grass (Hayland)	0.19
Legume/Grass (Hayland)	0.64
Forest Land (Grazed)	0.00
Forest Land (Not Grazed)	0.00
Soybeans (Row Crops)	28.85
Corn (Row Crops)	5.41
Cotton (Row Crops)	8.07
Wheat (Close Grown Cropland)	14.15
All Other Close Grown Cropland	1.80
Conservation Reserve Program Land	0.90
Other Cropland not Planted	13.55
Farmsteads and Ranch Headquarters	6.47
Non Agricultural Land Use	0.00

Table 4-28. Annual Estimated Soil Loss in Tennessee Portion of Subwatershed 0603000209.